**Materials and Methods**

Currently, electronic cigarettes are being marketed as a healthier alternative to conventional tobacco cigarettes, and their usage in the United States is steadily rising. Yet, there is little scientific evidence on how chemical components of e-cigarettes known as reactive aldehydes (acetaldehyde, formaldehyde, acrolein, and propionaldehyde) affect cardiovascular physiology and cellular function.

**Types of Electronic Cigarettes**

In order to identify the most popular, convenient, and highly rated electronic cigarettes, we searched and discerned several online polls, trends, and internet discussion forums. This led to the five brands of electronic cigarettes used in our study: Juul, Blu, Halo, V2, and VaporFi. Characteristics of each electronic cigarette are listed in table shown below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Product Name** | **Brand** | **Cartridge Type** | **Ingredients** | **Flavor** | **Labelled Nicotine Content (mg/mL)** |
| Juul | Juul | Juul Pod | Glycerol, Propylene Glycol, Flavor, Nicotine, Benzoic acid | Classic Tobacco | 50 |
| Blu Plus+ Rechargeable | Blu | Cartomizer | Vegetable Glycerin, Propylene Glycol, Nicotine, Natural and Artificial Flavors, Water | Classic Tobacco | 24 |
| Halo G6 Rechargeable | Halo | Cartomizer | Propylene Glycol, Glycerin, Flavorings, Nicotine | Prime 15 | 24 |
| V2 Red Disposable | V2 | Disposable | Propylene Glycol, Vegetable Glycerin, Nicotine, Natural Flavors, Artificial Flavors | Tobacco | 18 |
| VaporFi Express | VaporFi | Refillable Cartomizer | USP Propylene Glycol (66%), USP Glycerin (21%), Natural and Artificial Flavorings (30%), USP Nicotine (2.4%) | Classic Tobacco | 24 |

All products were purchased from commercial stores. All cartridges were characterized as high nicotine content (1.8 – 5.0 %).

**Generation of Vapor from Electronic Cigarettes**

Experiments were set up to reflect real-life smoking patters of electronic cigarette users. Batteries were recharged before every trial. A trial consisted of drawing approximately 400 – 450 mL of vapor into 0.5 L Tedlar Bags. The vapor from electronic cigarettes was generated through Masterflex tubing (96410-16) by a Masterflex L/S pump head (model 7518-00), connected to a Masterflex L/S pump drive (model 77300-40) and operated by a Masterflex L/S digital modular drive, at a rate of 600 mL/min, or 10 mL/sec. The vapor in the Tedlar Bags was then transported into the Voice200ultra SIFT-MS within 15 minutes of vapor collection. From there, four tests were performed. Trials were repeated 18-20 times.